GNG 1103: Deliverable B

Dr. Muslim Majeed

Adekeye Teye
7142255

Owen Cummings
300074121

Justin Power
300083066

Leena Tran
300088057

Shivam Syal
300065225

Will Hayes
300077212

Date of Submission: 01/27/2019

Introduction:

The entire premise of the project presented by our client is to build a temporary portable house that can be extended through simple means. The three houses that will be made are for families who have experienced domestic abuse and need a temporary safe shelter until the government can provide these people with a more permanent house to live in. Each house will shelter ideally a family ranging up to approximately four people. The houses will have a multitude of features a regular house has, one of which is a bed. The specific task for this group is to design a bed frame that will be used by the occupants of these temporary homes.

Limitations:

- Budget: $100
- Materials: must use cardboard only

Notes from the client interview:

- Twin or double bed size
- Support an average adult
- Be extremely stable; can handle people getting on and off the bed
- Should support the mattress at least 60cm off the ground (an inflatable mattress and a pillow is being provided by the client)
- Foldable if possible. If not, must be easily disassembled and easily reassembled, in as few pieces as possible
- There is a possibility of the frame getting wet
- Made from mainly cardboard
- Providing a crib or child-sized bed design would be a bonus)

Extracting from the notes made in the interview, the client's desires/needs are:

- It should be able to support up to 250lbs (average weight of adult is approximately 150lbs. Designing a bed frame that can hold 250lbs will ensure that the bed will most likely be able to hold any sized person)
- It should be foldable or easily disassembled for easy transport
- It should support the bed at least 60cm (2ft) off the ground
- It needs to be stable enough to not rock or fall apart when in use
- It should be durable against liquid spills

Ranking of the needs:

1. To be able to support a 250 pound full grown adult without issue
2. It needs to be stable enough to not rock or fall apart when in use
3. It should be foldable or break down for easy transport
4. It should support the bed at least 60cm off the ground
5. It should be durable against liquid spills

Relevant Information (about needs and existing products)

There has been one product on the market that satisfies these design criteria —Paperpedic bed by Karton. It costs roughly 190 USD. The Paperpedic is made entirely out of 100 percent cardboard. Its design incorporates folded and tabbed panels that interlock and connect to form a bed frame. These features allow the Paperpedic to expand from a twin-sized bed to a larger bed frame.

Cardboard is a generic term for heavy-duty, paper-based products. There are different types of cardboard, some of which include paperboard and corrugated fiberboard, which is made of multiple flat and corrugated layers. This project was given the limitation of having to be built entirely out of only cardboard. Since cardboard is a generic term, we have different options we may choose from. The strongest type of cardboard is the corrugated fibreboard. There are varying layers of corrugated cardboard you can get. The more layers the board has, the stronger the board is. Our design needs to be both strong and foldable/deconstructable, so we may not be able to simply choose the material with the highest ultimate strength. This is something we will have to experiment with to determine the best suited type of cardboard.

Official Problem Statement

To provide the domestic violence victims in the city of Ottawa a safe place to sleep, a lightweight compactable bed frame that is made from cardboard, can support a single 250 pound person and can be transported must be designed.

Conclusion

The client has a unique need, and as such there are currently very few existing designs to draw inspiration from. As well, our design options are significantly constrained by the requirement of using solely cardboard, which is not commonly used for structural support. We foresee the most challenging aspects of the design will be: selecting the correct type of cardboard that will provide enough strength while being easy to work with, interlocking the cardboard in a manner that is easy to both assemble and disassemble, and create a design that will be able to support a significant weight.